Terra Spatium SA

Geo-Information Products & Services

Large-Scale Area Monitoring for Maritime & Border Surveillance

March 2018

TERRA SPATIUM SA

Brief Company Profile

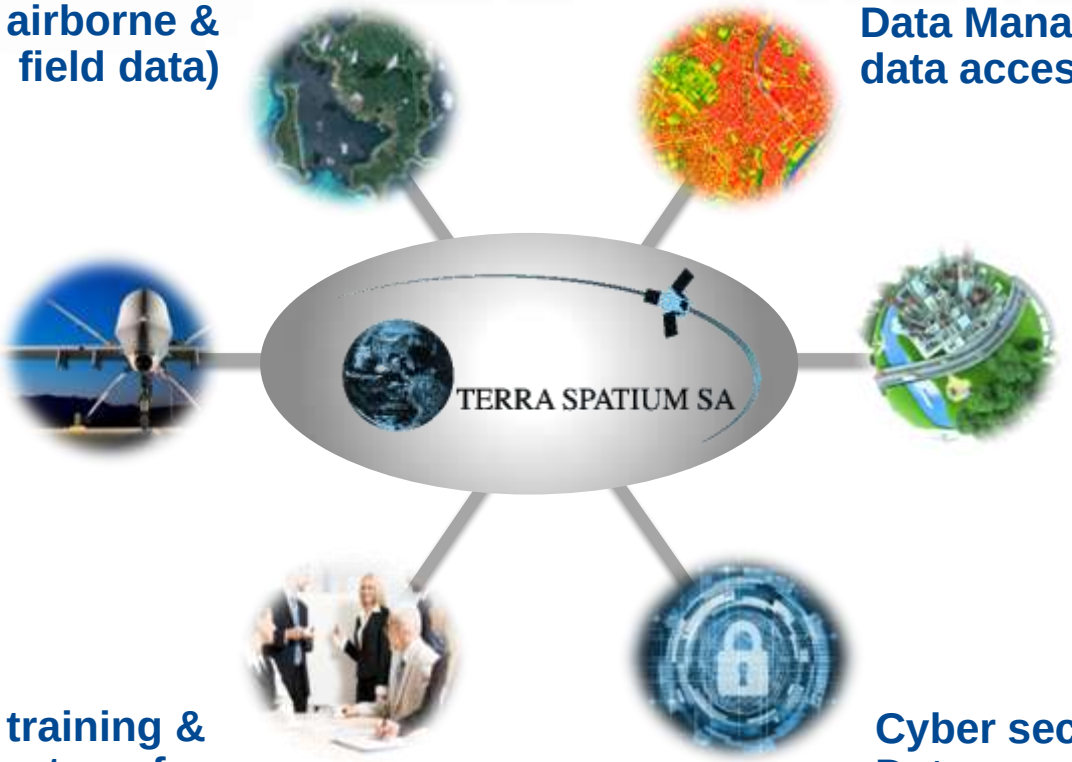
- Member of the Hellenic Association of Space Industry
- Member of Hellenic Space Cluster, **si-Cluster**
- Member of Hellenic Aerospace Security and Defence Industry Group, **HASDIG**
- Member of Hellenic Emerging Technologies Industry Association, **HETIA**
- Member of European Association of Remote Sensing Companies, **EARSC**
- Co-Founder of **EUGENIUS** (European Group of Enterprises for a Network of Information using Space) Association

Certifications: ✓ NATIONAL - EU NATO SECRET ✓ ISO 9001:2015

Field of Activities and Expertise

EO data acquisition (spaceborne, airborne & field data)

Geo-Information Services Data Management & data access



Defence & Security

Smart City Applications

Consultancy, training & know-how transfer

Cyber security Services Data processing

Partners

AIRBUS DEFENCE & SPACE

SAFRAN AEROSPACE · DEFENCE · SECURITY

CS

SCHIEBEL www.schiebel.net

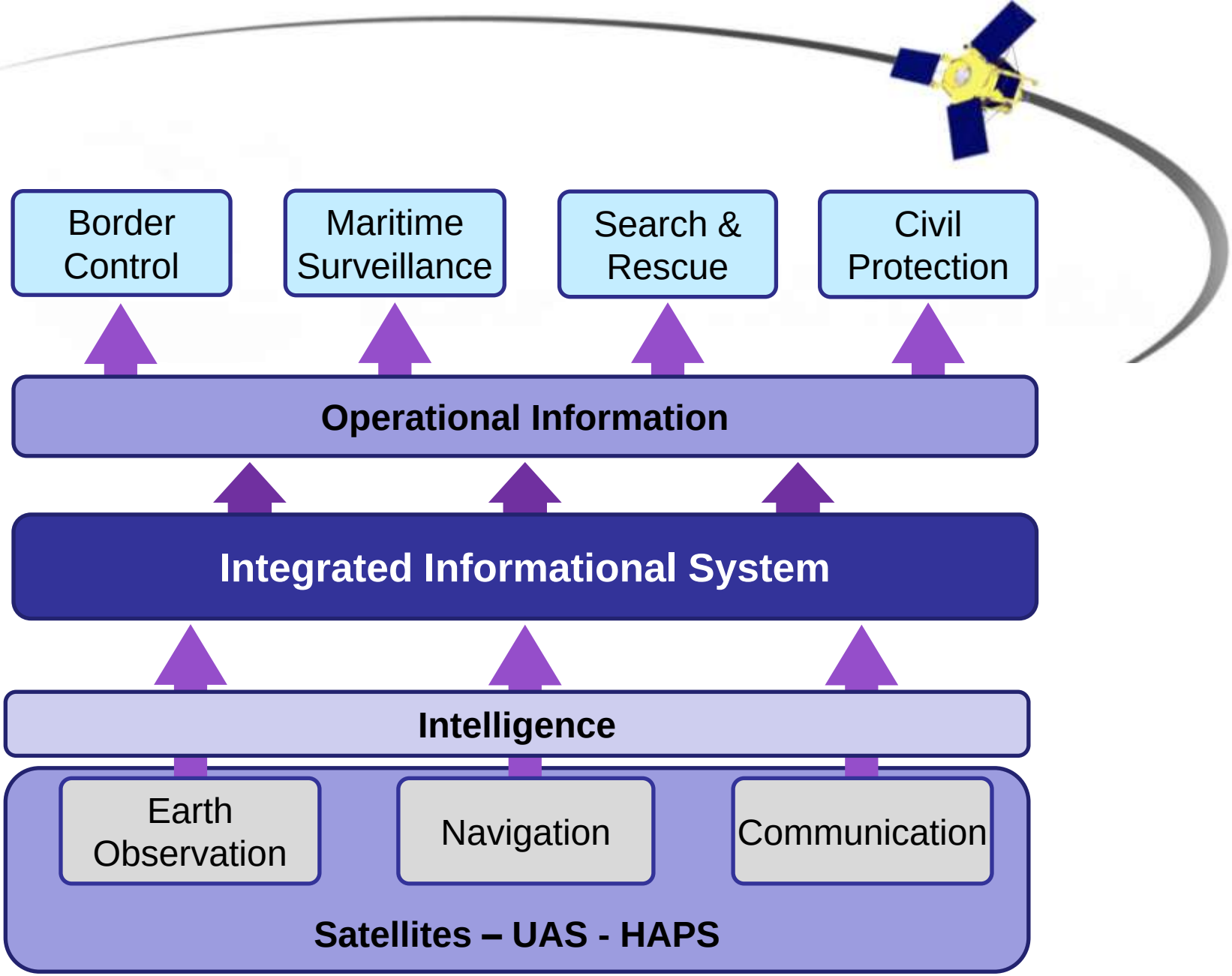
HARRIS®

RIEGL

Trimble

terraNIS New Information Services

OCEANα


Border Control
Maritime Surveillance
Search & Rescue
Civil Protection
Operational Information
Integrated Informational System
Intelligence
Earth Observation
Navigation
Communication
Satellites – UAS - HAPS

Objectives

- Detect and describe
- Observe and track
- Predict

Needs

- Accuracy and reliability
- Easy access
- Emergency response and fast delivery

Data acquisition

Pléiades

SPOT

CAMCOPTER S-100

TerraSAR-X

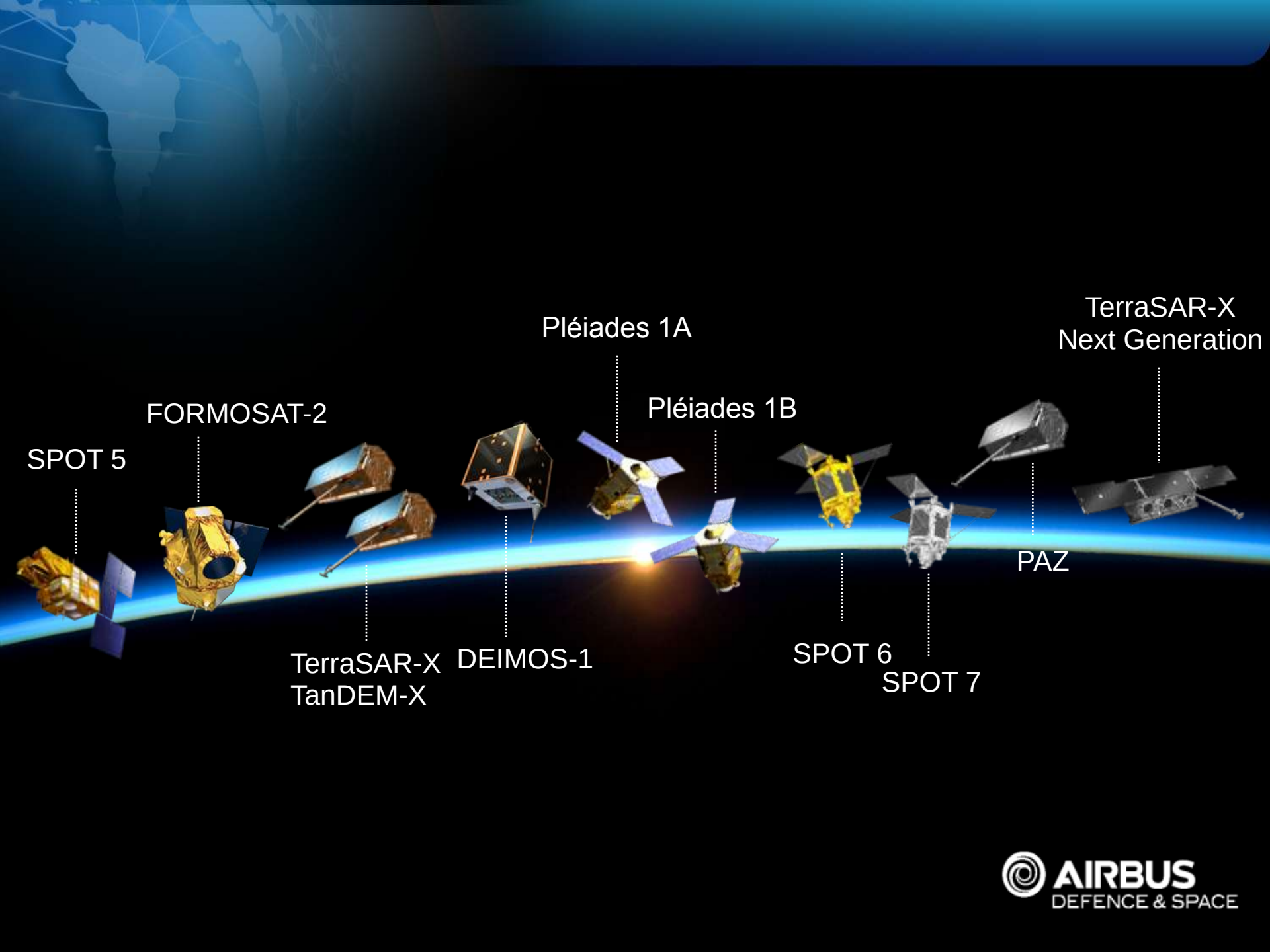
GEO Elevation WorldDEM™

HAPS

Access

Integrated Informational System

Benefit: the right information at the right time for operational efficiency



AIRBUS
DEFENCE & SPACE


FULL, FREE AND OPEN
ACCESS TO DATA
ATMOSPHERE MONITORING
MARINE ENVIRONMENT MONITORING
LAND MONITORING
CLIMATE CHANGE
EMERGENCY MANAGEMENT
SECURITY
opernicus
Europe's eyes on Earth

TerraSAR-X imagery

Operational case study

TerraSAR-X

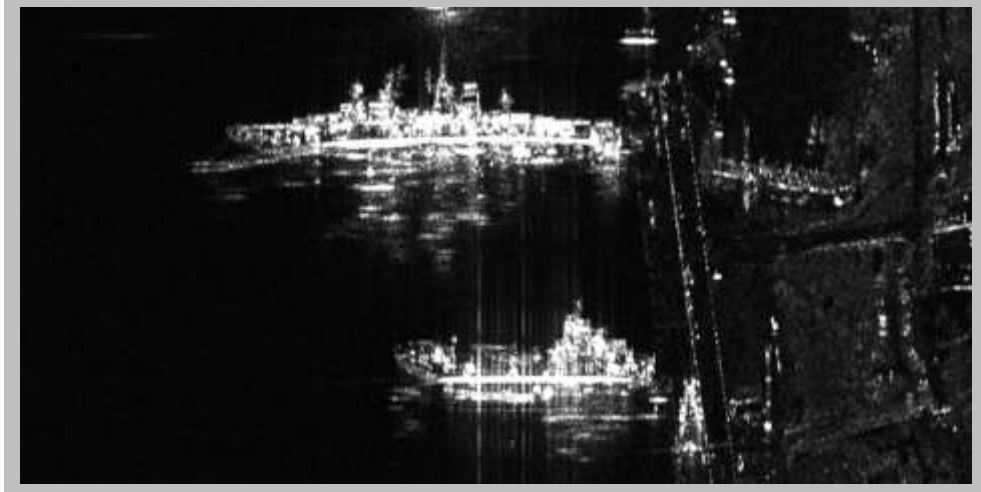
Tasking Date 04-03-2014

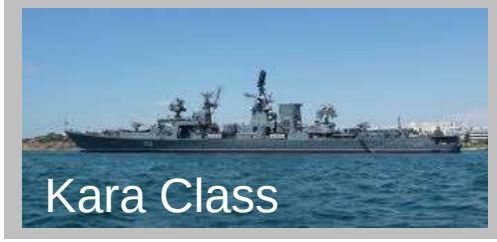
Delivery Date 05-03-2014

Acquistion Mode Staring SL

Requirements Navy ship activities

Describe naval situation and recognize warship





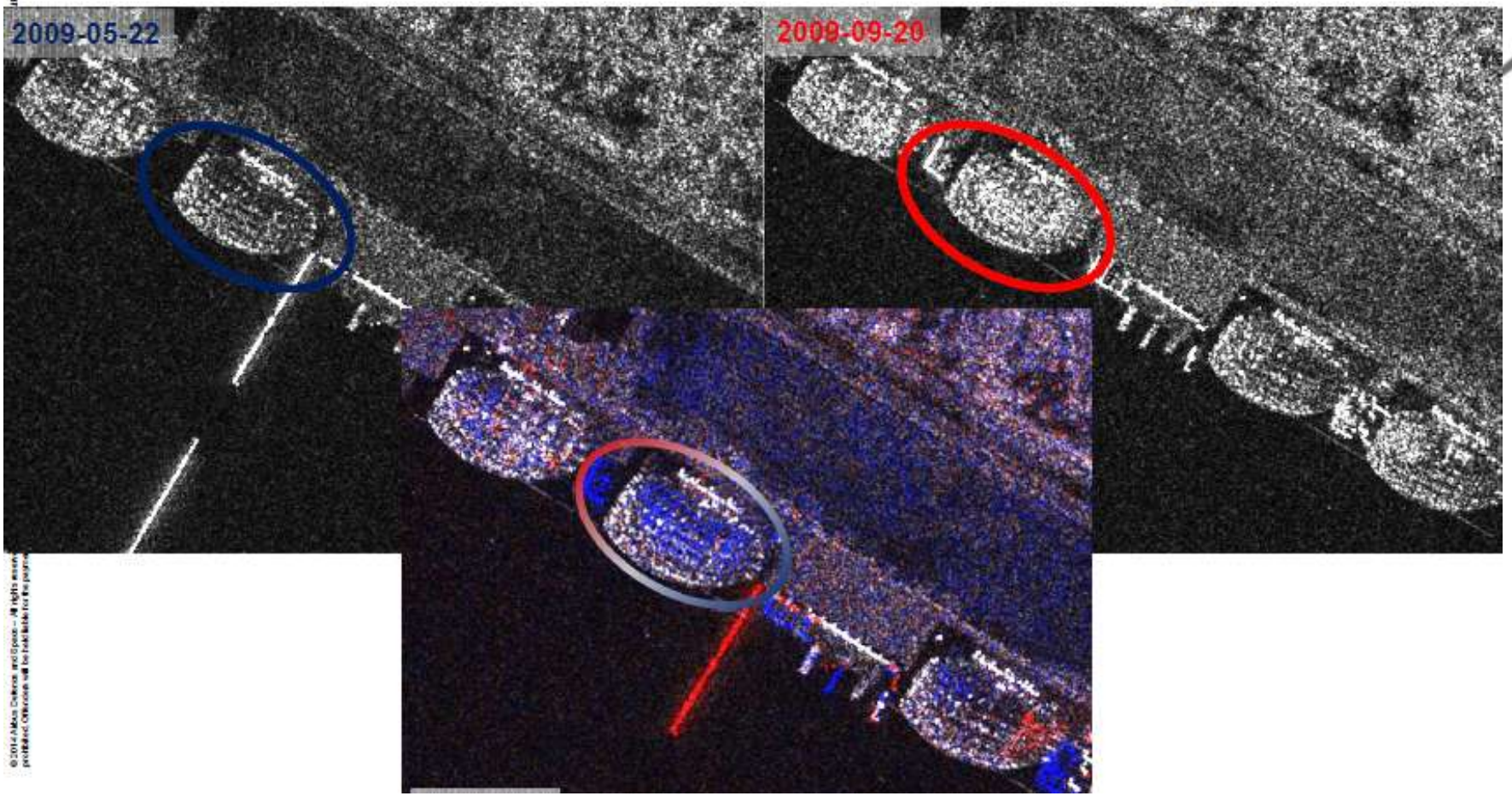
Kara Class

Alligator Class

0 2 km

TerraSAR-X imagery

Penetration of Aircraft Shelter material: Different status recognizable



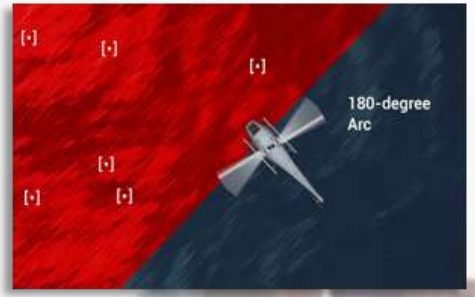
Pleiades imagery

Capacity of the satellite to acquire the 220-km Korean border line

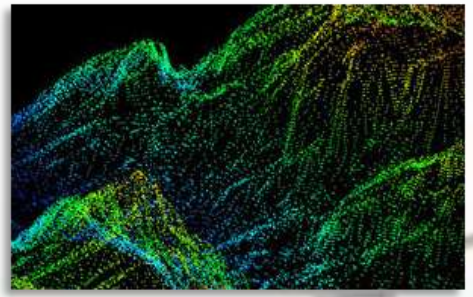
- ✓ Pléiades **One pass acquisition**
- ✓ North - South acquisition
- ✓ Corridor collection scenario to follow the coastline of the Korean border

Unmanned **A**ircraft **S**ystem

VIDAR



LIDAR



SIGINT/ELINT/COMINT

TYPICAL EO/IR

- Maximum speed: 222 km/h
- Cruise speed: 185 km/h
- Range: 180 km
- Endurance: 6 hours
- Service ceiling: 5,486 m (18,000 ft)
- Capacity: 50 kg (110 lb)

Unmanned **A**ircraft **S**ystem

Search & Rescue

Day and night operation using real-time, full-motion video from both high-definition color-video and infrared cameras makes UAS an effective tool for search and rescue operations.

Anti-Smuggling

UAS has been proven to deliver real-time information for decision makers and border patrol personnel, making this an indispensable tool in the global battle against contraband, drug, human or arms trafficking and in the fight against organized crime.

Coastal Patrol

Diminishing budgets and resources are moving ship design away from the large capital ships of the past to smaller more cost-effective solutions where operation of conventional manned helicopters becomes considerably more difficult. Embarking a tactical rotary UAS can cost-effectively replace the lost ISR capability.

Reconnaissance

UAS delivers long-range real-time reconnaissance up to 200 km, satisfying a wide range of user requirements. Ground-control user interface offers field-proven mission planning and execution capabilities. It provides easy access and allows swift integration with higher levels of command and control systems.

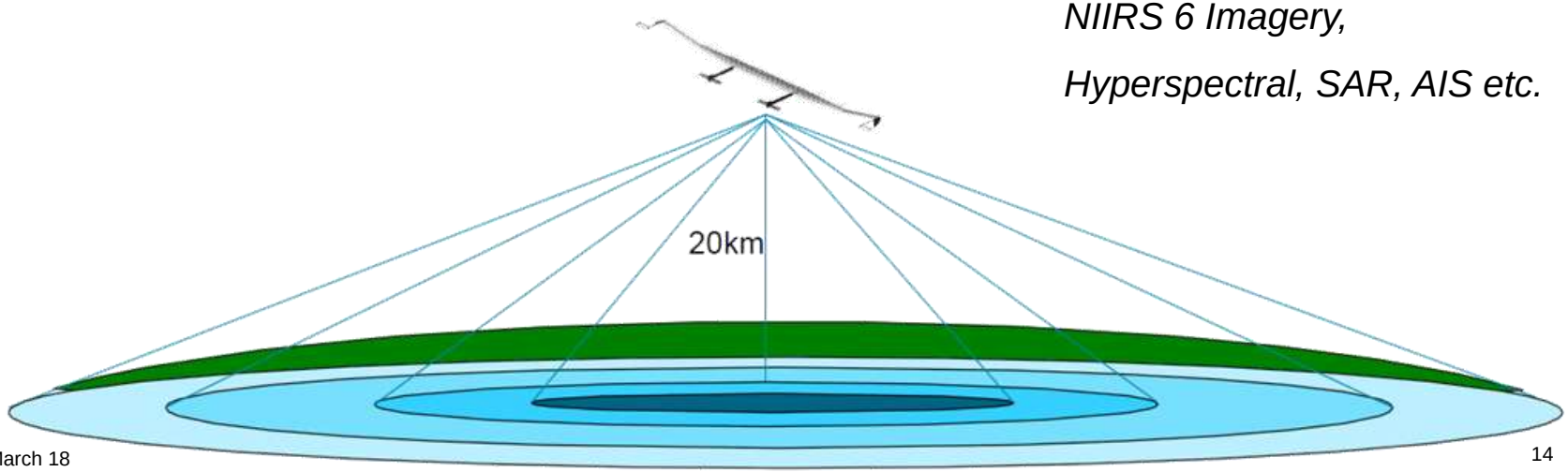
High **A**ltitude **P**seudo-**S**atellite (HAPS)

World's most advanced and only flight proven HAPS

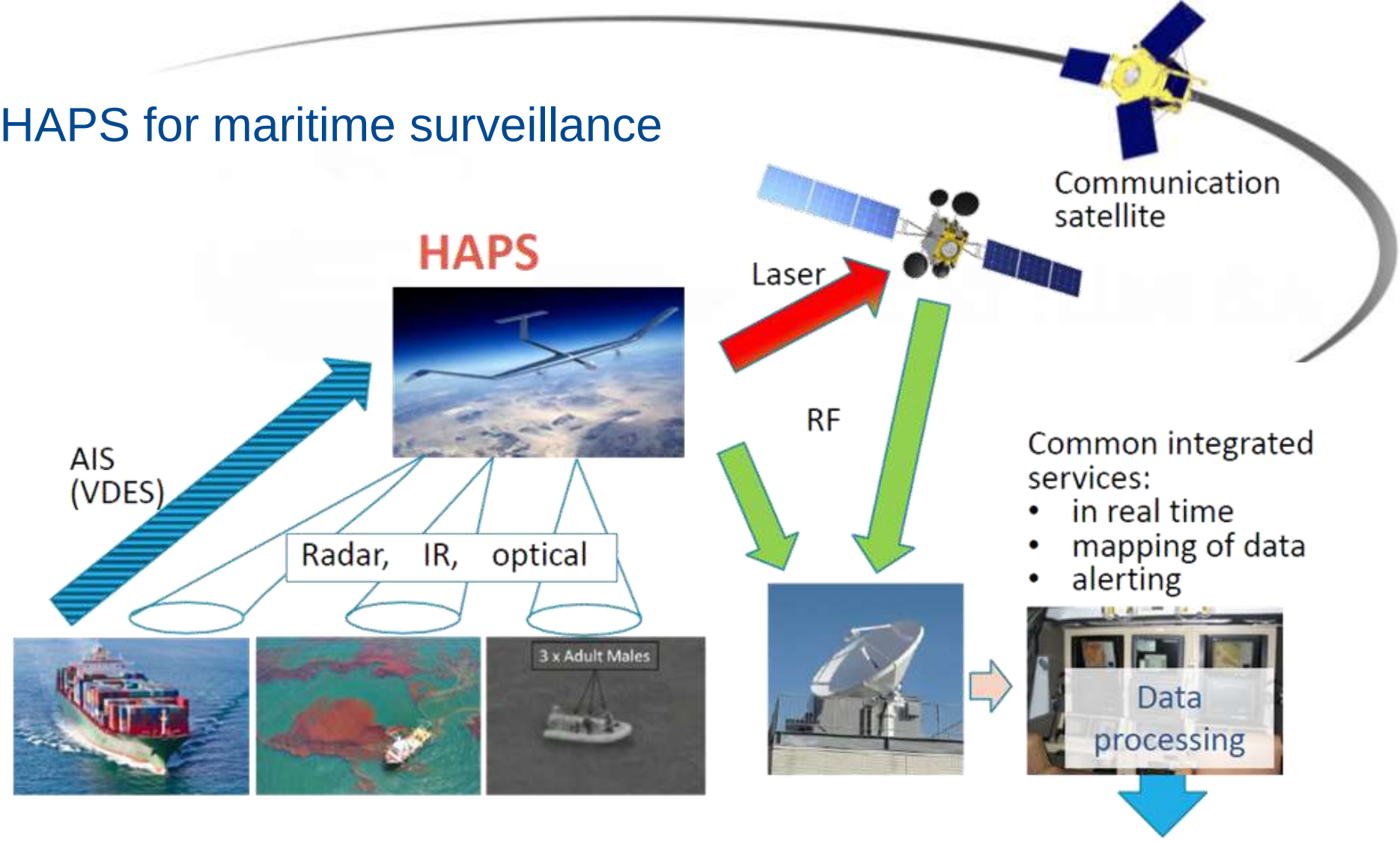
Focus of an Aircraft,

Endurance of a Satellite

- Solar Powered
- Span: 40m
- Altitude: 20km
- Payload: *HD Optical, IR Video, NIIRS 6 Imagery, Hyperspectral, SAR, AIS etc.*



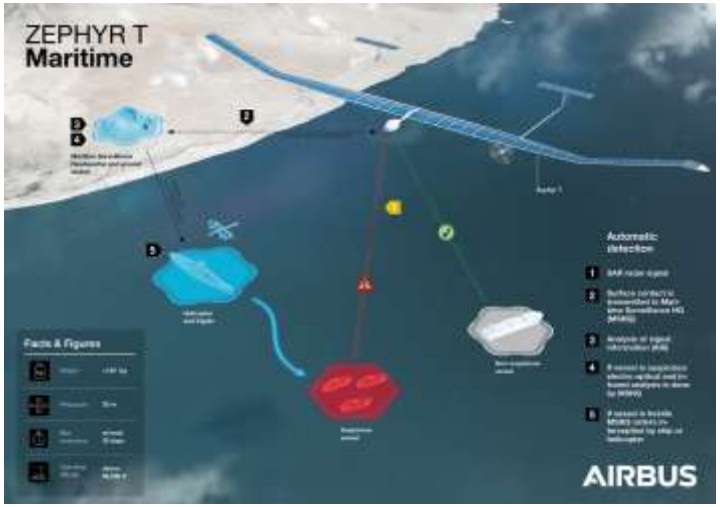
HAPS for maritime surveillance



How could HAPS help…

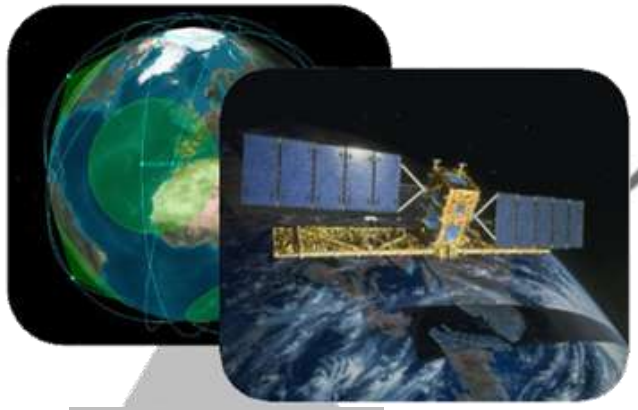
- <u>HAPS will complement the EO satellites services by:</u>
  - ✓ Covering the time gaps due to sun synchronous orbits
  - ✓ Staying on location if necessary
  - ✓ Carrying complementary payload/sensors

- <u>HAPS will be a complementary application for RPAS:</u>
  - ✓ Providing coverage of wider sea surface areas
  - ✓ Providing extended endurance for continuous surveillance or during disasters/incidents (big oil tanker spills, search and rescue, etc.)



Next step…

HAPS



EO Satellites

UAS

AIS

Observations

integrated maritime services

- Common interface
- Maritime picture
- Data fusion

- Ship registry
- Maps

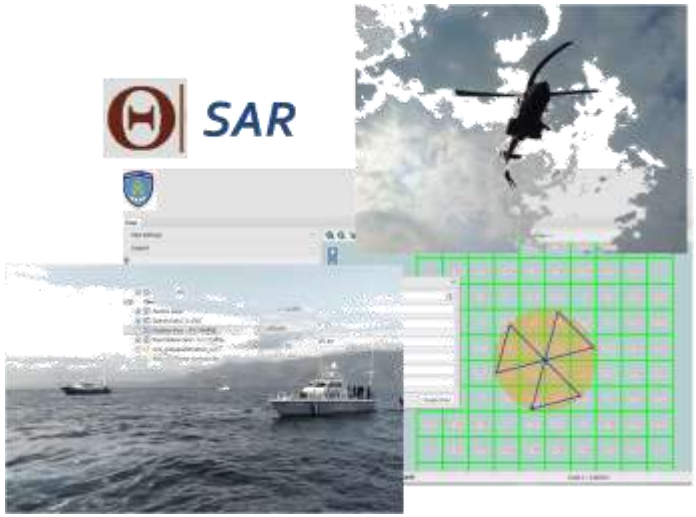
Port state information

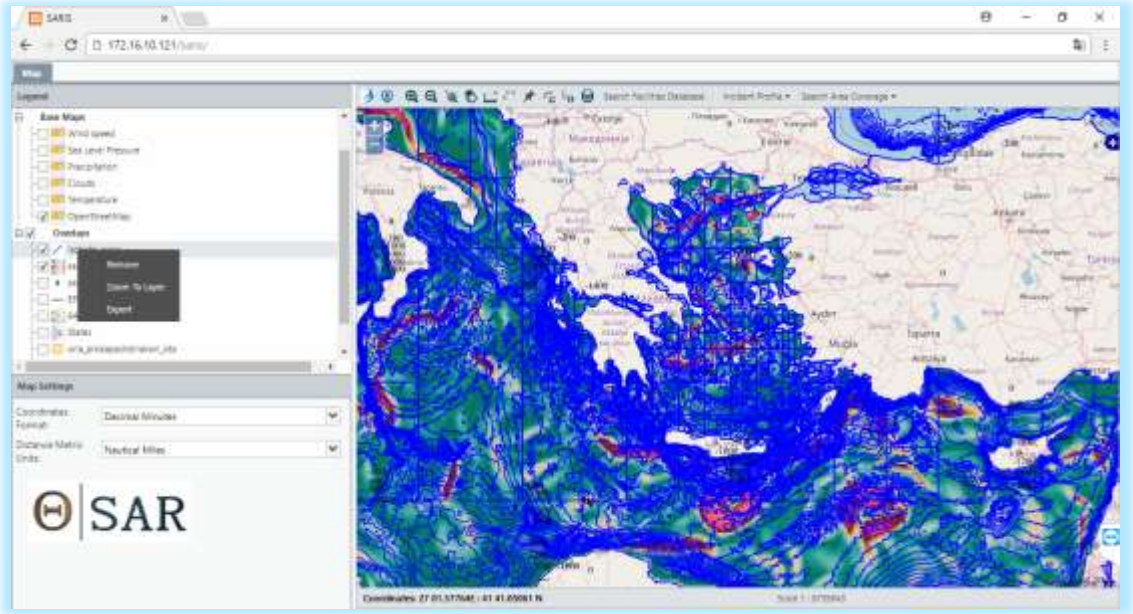
- Models
- Behaviour analysis

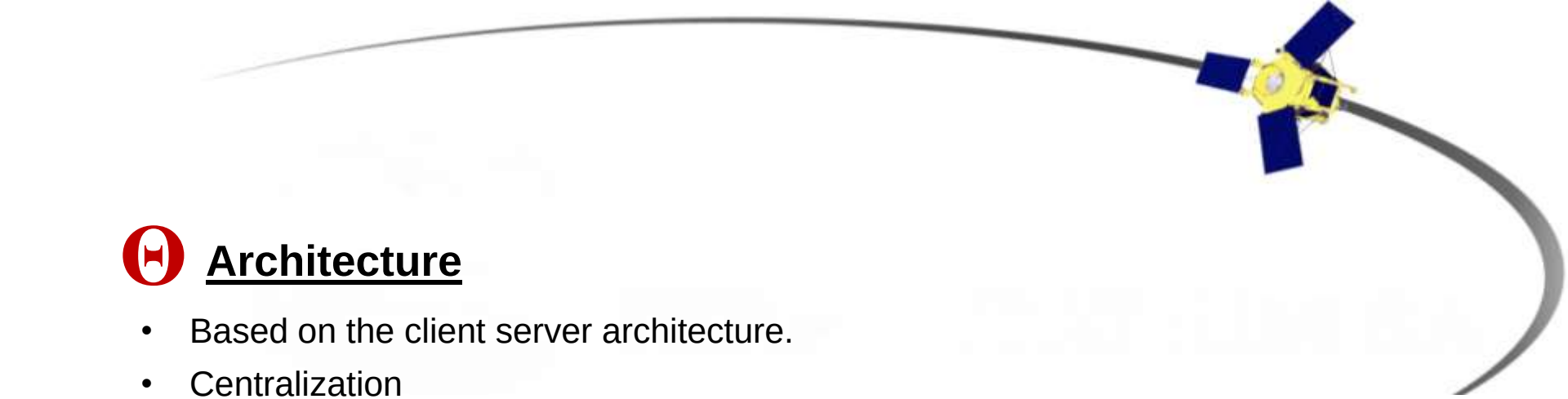
SAR

Search & Rescue Informational System for Hellenic Coast Guard

- Real-time processing
- Geo-Server integrated
- AIS Marine Traffic
- High-level algorithms







Architecture

- Based on the client server architecture.
- Centralization
- Proper Management: Since all the files are stored at the same place management of files becomes easy, making it easier to find files.
- Upgradation and Scalability in Client-server set-up.
- Accessibility: From various platforms in the network, server can be accessed remotely.
- Security: Rules defining security and access rights can be defined at the time of set-up of server.
- Servers can play different roles for different clients.

  - Real-time processing
  - Geo-Server integrated
  - AIS Marine Traffic
  - High-level algorithms for Search & Rescue

Conclusions

- Detect and Describe
- Observe and Track
- Predict
- Accuracy and Reliability
- Easy Access
- Emergency response
- Fast Delivery

Thank you for your attention!

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